

COOP'S TECHNOLOGY DIGEST

-A Timely Report on The World of Communications-

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Digital Security is Breached

Early this year pay TV conditional access security company Irdeto announced a minor change; they would gradually change their name to Mindport. It did not seem important at the time other than to those directly involved at Irdeto.

Irdeto holds a five year contract with Australian pay TV providers. That contracts sets out the terms of providing Austar and Optus with a security system designed and created to stop unauthorised viewing of digital MPEG services transmitted by both firms. On a temporary basis, Foxtel satellite shares the Irdeto conditional access system with Austar.

There are in the world today two major pay TV security firms. One is Irdeto and the other is NDS. Irdeto began as a Dutch company, has with the name change to Mindport become more of a middle eastern firm although it still maintains technical laboratories in the Netherlands. NDS is part of the Rupert Murdoch empire and all of the highly technical and closely guarded security design work is done from a facility in Israel.

The belief has been that while analogue encryption schemes (including Videocrypt used by Sky NZ's UHF analogue terrestrial delivery platform) have been widely compromised for as far back as five years, the "magic" of digital would make penetration of the MPEG conditional access routines far more complicated. Analogue systems were quite easily violated because security system designers elected to transmit all of the "secret key" information through the air to the individual subscriber locations. Those who would covet breaking the "secret keys" found this technique very helpful to their goals. Ultimately, "busting" Videocrypt was as straight forward as copying the "secret keys" being transmitted so freely through the air.

Sky NZ was first faced with violation of their analogue pay TV services in March, 1994. CTD reported (April 1994) on a posting found on an Internet Web Site which at the time provided step by step instructions for viewing Sky NZ (or any other Videocrypt "protected" service). Sky would respond to our report by stating, *"Although we are aware that piracy hackers have caused some problems in Europe to the Videocrypt smart card system which we share (in common) with European television programme sellers, this has not been a problem in New Zealand."*

Sky had no choice but to make this statement. If it became common knowledge that a person could watch Sky programming without paying for it, their entire business plan would be at risk. Programmers who have been attacked by pirates *never* admit there is a problem because that action throws gasoline on a smouldering fire.

It is a fact, no matter how often or with what carefully chosen words Sky denies it, that some quantity of non-paying Sky terrestrial analogue viewers exist. The information continues to be posted on Internet, and commercial products based upon these postings are widely advertised and sold. Satellite TV magazines, consumer magazines available on news-stands, carry full page advertisements for "unofficial viewing cards" throughout Europe. The same techniques that work in Europe also work in New Zealand and Internet delivers that information to New Zealand PCs upon request.

Sky's protection for the middle term is their new digital transmission system supported by an NDS security package. The NDS security system and that sold under the Irdeto/Mindport brand are very similar. Both rely upon digitised data streams to electronically "address" a "conditional access module" (CAM) at the receiver. The conditional access module is basically a "switch" that allows

the reception to be turned on and off. The instructions (data stream) to operate the switch originate at the satellite programmer's computer and the switch must have a set of "keys" to operate. Some of the keys for a specific CAM are transmitted through the TV broadcast data stream; the remainder of the keys are imbedded inside of the "smart card" which completes the package. A CAM without a functioning smart card has only a portion of the keys required to operate the switch. The keys imbedded in the smart card plus the keys transmitted through the data stream make up the complete set of keys required to turn on a specific receiver.

Irdeto Compromised

Reports of "piracy" of Austar (Foxtel) services surfaced coincidentally with the financial failure of Galaxy (Australis) last May. Those reports said that Irdeto "busting technology" originating in Europe had been imported to Australia and was being employed to gain access to Galaxy programming without payment. The reports died away when on May 21st all Austar (Foxtel) transmissions turned off their conditional access system. The CA remained turned off until August while the financial affairs of the defunct Galaxy were resolved. The incentive to "bust" a system that was free to air anyhow simply disappeared.

When scrambling resumed the reports surfaced again. Within six weeks (late September) of scrambling resumption Internet discussion groups were abuzz with esoteric postings falling into two categories: Those that proclaimed "the King is dead" and those lamenting the failure of modern society to police itself more effectively.

Irdeto may not be dead; it is, however, significantly wounded. And the mystery clouding this issue is why the security firm seems unable to do anything about the violations of its conditional access package. The facts.

1) Irdeto's smart cards have been compromised. It is now possible to acquire in open (Internet) commerce "unofficial smart cards" from European sources for six Irdeto protected satellite programming bouquets (Italy's Tele Piu, and Stream; Germany's DF1, and Multi Channels South Africa, Middle East and Hellas [Greece]). Note that at the moment, Australia's services are not included in this particular level of European commerce.

2) A device known as a "Smart Card Reader / Writer" when connected to a home style computer and the normal IRD allows a substitute (non-approved) smart card to be used in place of an authorised card. One model designed and produced in the UK manipulates the Irdeto data stream to prevent the unauthorised card from being turned off.

3) Yet another version of the "Smart Card Reader / Writer" has the ability to copy authorisation information imbedded in one valid card to a second (third, etc.) card. This is called cloning, and it allows one legitimate subscriber to "feed" the same authorised service to a number of non-paying viewers.

In some cases "unofficial smart cards" (#1 above) may in fact be cloned cards (#3, above).

The Streams of Commerce

Any user of an "unofficial card" is depriving the programme bouquet operator of revenue. Perhaps with the intent of justifying their activity, one distributor of Irdeto cards in Europe explains in literature:

"Unofficial cards are not issued by the broadcaster. They are commonly known as 'pirate' cards. Their popularity comes from the fact that (many) broadcasters do not allow official subscriptions outside of a pre-defined (geographic) region. For instance, it is impossible to subscribe to TV1000 if you reside in the Netherlands."

The literature goes on to suggest the "unofficial cards" are made available as a means to allow people living beyond the broadcaster's normal service region to access the programming. Other literature makes the point that "unofficial cards" are often priced below "official cards," so there is an element of cost as well. Understanding the motivation for the piracy industry is important.

1) *Not available here.* Programming packages are sold in clearly defined geographic regions based upon programme rights (copyright) and to a lesser extent upon satellite coverage. For example, while it might be possible for residents on Norfolk Island (450 miles NW of North Island) to access the new Sky (NZ) digital package, programming rights secured by Sky do not include customers on Norfolk. Sky would therefore deny service to receiving installations known to be on Norfolk. To a

much larger scale, Dutch pay programming legally available only to residents of the Netherlands is accessible with small dishes throughout all of Europe.

Thus the "unofficial card" ploy. By whatever Irdeto busting technique, cards are created which end up operating home IRDs in Germany, the UK and Italy. The programmer typically receives no revenue for these reception points, and his programme rights (copyright) did not include serving customers beyond the Netherlands in the first place. Virtually every European country now has a pay-TV package copyright cleared just for that country (or in some cases a group of countries). Given the size and population of Europe and the diversity of the population, there is quickly a market for tens of thousands of "unofficial cards" for most services. (1)

2) *Not available to the general public.* This is the (American) AFRTS situation; programming created for a specified group of users (in this instance, the U.S. military and diplomatic corps) but not offered to the public at large. Because it is American network programming, released on the same date as in the United States, it has a significant appeal.

3) *Available but priced too high.* For some percentage of the population, all pay-TV programming is too expensive. When individual channels of Indian origin programming are placed on satellite in the United States and offered for US\$25 per month, there is a quick response that the viewers are being "ripped off." Piracy flourishes in this situation because viewers feel they have a "right" to combat rip-off prices with whatever tool is on offer to beat the pricing.

Cloning, a relatively inexpensive piracy technique to implement, appeals to viewers who feel they are being ripped off. If one person subscribes at the full \$25 rate, makes nine cloned cards to share with 9 friends or relatives, each of the ten users now has \$2.50 per month invested in the service.

4) *Because it is there.* "Beating the system" is a technical challenge, involving a combination of skills. This is the technical hobbyist and he will seldom "share" his ability to "bust the system" with others or at most only with a few similarly inclined technonerd.

And there are subsets. A particular problem in Europe presently is the pricing differential for service to single dwelling homes and MDU (multiple dwelling units - flats or apartments). MDU pricing, per user, is lower but always more than for a single dwelling home because of home quantity. To camouflage MDU installations as single dwelling installations is risky and subject to periodic verification. If the MDU is served by an "unofficial card," it is not on anyone's subscriber list and therefore cannot be subject to field verification in the first place. Further, the line of distinction between an MDU and a cable TV system is often blurred; a particular problem in Asia. In each case, the "financial incentive" to set up a multiple outlet facility as either a single family dwelling or as an "unofficial" subscriber is considerable.

The Cost of Busting Irdeto

For those living outside of designated service regions (such as the Italian wishing access to Dutch services), cost may be a secondary consideration. Irdeto "unofficial" cards are selling through Internet ordering sites in the region of US\$250. Is this per year? Not necessarily. One such Internet site advises clients:

How long will the cards function? "Broadcasters are able to change the decryption codes, some do this more frequently than others. When this occurs, (your) card may stop working. Multi Sat Nederland will provide an updated card provided the codes are available. However, there is no 100% guarantee for this to be the case."

So there is an element of risk involved with cards obtained in this manner. Some unofficial card sources will guarantee "48 hour replacement" of cards should decryption codes change but only offer this as an extra payment option to card purchasers. Pirate card suppliers are first and foremost

1/ Another, older approach to the same problem, involves creating a false address for a subscription. An Italian wishing access to Dutch services arranges for an address in the Netherlands where the receiving system ostensibly is located. And in fact, it may well be at that address but the part that makes it operate, the smart card, is shipped to Italy where it is inserted into a duplicate receiving installation. In this instance, the programmer is paid his normal Netherlands' rate for the subscription, only the location where the programming is used is at odds with an "official card" installation.

business people and view card decryption code changes as an opportunity to create additional income for their enterprise. This particular category of unofficial card supply views the consumer as an individual who wants a level of pay-TV service comparable to the "official" card users located in the proper geographic area where official cards are available. The card sellers and card buyers are both acquainted with the fact that "unofficial" cards are not "official cards" and the buyer is unlikely to raise too much fuss if the cards are occasionally turned off.

There are two alternate techniques which minimise the inconvenience of having a card turned off. In the case of cloned or duplicate cards, the original master card is a paying subscriber to the system. As long as this card is kept active (through regular payments), the duplicate or clone cards that have been reloaded with the same addressing information as the original will continue to function as well. Visualise cloned cards as duplicate keys to a door lock. As long as the lock is not changed, the keys will continue to function. Cloned cards were initially popular with piracy business people because the technology to create them was quickly established. But there were problems related to the business aspects of cloning cards.

- 1) Each clone card requires a relationship with a legitimate paying master card.
- 2) A cloned card can be duplicated directly from the master or from another clone of the same master (i.e., multi-generation clones).
- 3) How does the business person creating the clones "control" the quantity of clones from a single master?

Moreover, what determines the "safe" number of clones that can be duplicated from a master? "Safe" relates to being caught or uncovered by the programmer firm's security forces. Pirates have to "market" their product and while Internet is a relatively safe way to stay visible while not being directly touchable, it is not a perfect subterfuge. The major conditional access firms (Irdeto, NDS et al) belong to an "association" that typically meets several times each year to share information about piracy firms. Moreover, each of the conditional access firms employs internal "security" personnel who snoop out pirate operations. And the Irdeto security operation is in turn supported by programmer security personnel; Optus, for example, has a security team routinely collecting information about individuals and firms that might be a threat to their pay-TV operations. (3) .

For the commercial pirate distributing cloned (duplicate) cards, there is a challenge to maximise profits (use one master card for as many duplicates as possible) while at the same time not creating so many copies that one or more are likely to fall into the hands of the various security forces. The distribution chain for cloned cards tends to be "loose" (many are sold and resold in pyramid fashion) and sooner than later someone buying a card has a technical problem and calls in service people from the programmer not aware their card is defective and the cause of the reception problem. More often than not, cloned cards are discovered because consumers who are unaware of the card's origin simply hand it in to the programmer thinking their card is defective. When a programmer discovers a cloned card (something most programmers claim they can spot if they have the card in their possession), they simply extract the card's unique electronic address number and turn off the card. However, they are *also* turning off the entire family of identically addressed cards cloned from the same master - and the master as well. If the pirate has made 100 clone copies from a single master, all 100 shut down simultaneously. And if the programmer has the time to investigate, his own files will lead to the physical location recorded for the master card. Pirates are not stupid - they seldom (if ever) leave the original or master card *at* the recorded initial location knowing it's physical location is a traceable link to their business.

And there are subsets of this activity. Just as you are well advised not to leave your credit card carbons laying around loose in a retail shop (the threat that someone can use your card numbers to charge to your card), so too are consumers at some risk when allowing "service people" to gain access to their pay-TV card. One of the first people "caught" when cloned cards arrived in the United

2/ Optus security is under the tutelage one Charles Gregory. His business card calls him a system installation specialist. Security for their satellite delivered product becomes increasingly important as the size of the pay-TV universe grows. Small pay-TV operations seldom attract pirate interest; pirates, too, are interested in "volume" and large, successful operators are their primary target.

Internet Report on Irdeto "Hack"

(Death of a system - Irdeto Hacks). The best known digital system in use throughout Scandinavia, Europe, South Africa, Saudi Arabia and Greece has been hacked for more than one year. The designers of the system seem incapable of doing anything about the hack. With thousands of pirate cards in daily use in all of these regions, reports of a new hack have now surfaced with the claim the latest hacked cards are more secure from violation than the original factory designed system.

A new hack that permits the switching on of official cards is now being launched. The Irdeto system seems doomed as dealers grow concerned that because of the success of the hacks the financial viability of the various Irdeto programmers may be so compromised as to threaten their continued operation.

The first hack of the Irdeto system appeared in the market in mid 1997. The German d-Box built by Nokia was intended for use only in Germany. However, the operating system was quickly hacked and the box was instantly being exported throughout Europe. Nokia did not support this directly, being on the surface loyal to the German programmer who had ordered the boxes, but in short order conditional access modules (CAMs) were mysteriously available through Nokia outlets Europe-wide.

Irdeto is responsible for what happened next. The first Irdeto service in Europe ran in a test mode that created a data stream that could be 'read' by anyone versed in digital data stream programming. In effect, Irdeto was careless, left their test mode service operating for weeks and this gave the hackers ample opportunity to dissect the data stream and create 'unofficial cards' for the services. The hackers were very cautious not to release their results until they had proven to themselves that Irdeto could not countermand the data stream with ECM (electronic counter measures) to turn off the pirate cards. The original Irdeto busting card was known as COP. A later version, developed after Irdeto tried an ECM to shut down the COP version, was called The Gold Peg.

At this point Irdeto made the classic mistake of not changing the key so the card always returned the same answers (normally the seed key is changed in a random fashion). The Gold Peg has been running successfully more than 12 months, an estimated 100,000 cards are in use. It is based upon the latest Thomson chip, off the shelf technology with 8051 core.

Virtually anyone who dumps the code can understand the programme.

The Gold Peg has been so successful that raw card materials have been in very short supply. Irdeto tried to convince Thomson not to sell chips to any firm that 'might be affiliated with pirates.' Letters were sent to firms suspected of being pirate card sources warning them of possible prosecution.

Now on notice, the pirates decided to design their own Irdeto card from scratch around an AMTEL chip - a chip that Irdeto has no control over. The result is the third generation Irdeto card, the Hornet which is available as Hornet 1 and Hornet 3. Here is the interesting original design with Hornet. The dealers buy Hornet cards that come preloaded with data stream packets for each of the seven Irdeto CA services available (DF1 through Tele piu). The user can switch between any of these services up to 3 times as the card is handed to them. This allows the user to randomly view bouquet by bouquet to make a 'permanent' viewing decision. By the third 'selection' the viewer has to stay with one bouquet (which typically has 20 or more programme channels). The list cost of this card is US\$280 although pricing as low as US\$150 is found on Internet.

Finally, there is the most recent hack which involves taking an official card and turning it into an unofficial card. A customer subscribes to a service, receives a card, pays for perhaps a month of service. Then he takes the official card to an 'exchange service' and turns in the old card. What he receives back (after payment of a fee) is a replacement "official" card which has been reworked by software to provide full service from the chosen bouquet. The beauty of the new "revised official" card is the claim that it cannot be turned off by Irdeto or the programmer.

Note: The Irdeto system in use by Austar / Foxtel / Optus in Australia differs from the Irdeto systems originally "busted" in Europe only by having different regional keys. Australian's using the European technology have extracted the keys for their region and versions of The Gold Peg and Hornet 1 and 3 are now available in Australia.

(source: www.thoic.com/per/irdeto.html)

States was a Federal Court Judge. It would later turn out his IRD plus smart card had been serviced by a shop that took the opportunity to make a clone copy of his smart card while the receiver was being serviced. The clone copy of the Judge's card went on to be a master for hundreds of other cards until ultimately one of the clone copies fell into security force hands.

There was a period of time where cloning of cards required special skills and equipment. The cost of becoming a pirate was as follows:

- 1) Acquisition of specialised equipment and software
- 2) Sourcing expired official cards to be used as unofficial cards after modification, or, sourcing brand new blank cards
- 3) Establishing a master official card at some acceptable ratio for cloning of copies (such as 1 master for 100 copies) and arranging for the 'cloaking' of the actual master card location once the initial subscription order is activated.

To make even one clone card required in investment in the range of US\$5,000. But not any more.

The MK12 (smart card) Programmer

The smart card used for pay-TV acquisition is essentially the same smart card used by telephone firms for advance credit. If it is possible to reload an expired pay-TV smart card with new data that turns it into an "unofficial" access card, might it also be possible to take a \$20 telephone company card that has been spent and reload it with new credit?

The smart card reader / writer is in response to that challenge. And the MK12 is a British sourced (Sterling 79) product that is now being sold in Australia (A\$250) to those who are tempted to try their hand at making piracy cards. There are other variations to the Mark 12 from at least two other European sources (the Multi 1 Phoenix smart card reader / writer is one such device selling through Internet for US\$125). The reader / writer is a device that allows the content of a smart card to be altered or re-entered or changed completely. It was not developed specifically for pay-TV smart cards and the technology is at least 8 years old. What has happened in the last 15 months is the implementation of this perhaps clandestine device for pay-TV card alteration purposes. The typical smart card reader / writer is sold "*for circuit development purposes*" or as "*an educational tool*" and the sellers are quick to disown any use of their product for illegal purposes. The standard reader / writer has a trio of IC chips supported by a modest number of discrete parts (resistors, capacitors). The parts are mounted on a circuit board and the board is equipped with a "thin end" and a "thick end." In the pay-TV application, the thin end of the board slides into the receiver's (CAM) smart card slot in place of the smart card while the unofficial smart card slides into a card slot built into the thick end of the board. In use, the reader / writer inserts into the IRD/receiver and sticks out several inches from the front (the reader / writer is longer physically than the smart card it replaces).

The MK 12 requires a 12 volt / 300 mA wall socket power supply to operate. A newer version scheduled for release in mid-November borrows operating power from a satellite receiver doing away with the need for an external supply.

In use, the MK 12 requires software (computer instruction) to tell it what to do, and when. The software is widely promoted as "being available as shareware on Internet" but the truth is more complex than that. (3) To use the MK 12 to rewrite an existing pay-TV card, a PC (personal Computer) must be temporarily connected to the device. The PC, using the fabled "shareware software," reconfigures the smart card contents and inserts what the trade calls a "blocker code," new software that has the ability of isolating the data stream bits so programmer instructions to shut down

3/ Internet web sites that are reported to have "public domain" software are elusive and not clearly identified. That they exist is not in question; that casual searchers will find them is. Starting points include - www.multipage.net/multi/cards.html and www.maxking.demon.co.uk and www.wedzboyz.demon.co.uk. These sites have [links](#) to others with software; be warned. Software is typically not blatantly so-named and usually is in a "zip file" format that will require care to unlock. Some Internet providers only allow access to their "public domain" software when you purchase a card reader / writer from them. Volcano and Volcano 32 products, for example, have been created to duplicate up to 6 smart cards at a time (speed being an ingredient of efficiency!) but they withhold access to their company controlled Internet software files (necessary to make it work) for those paying US\$499 for the device.

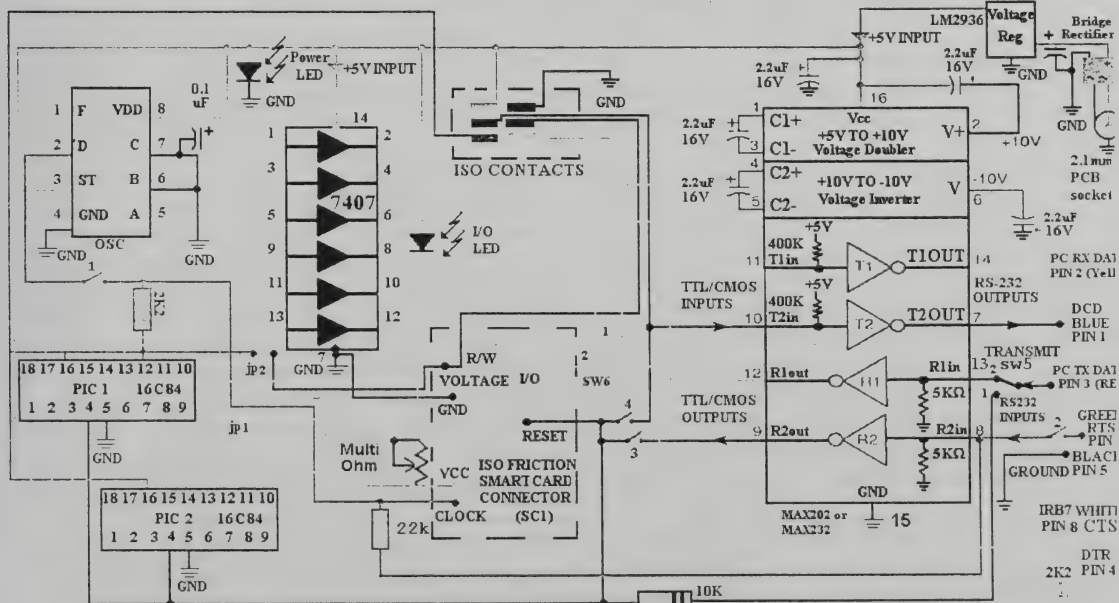
a card are "blocked" from the reconstituted smart card. This leads to the claim by MK 12 producers that once the system is installed, *"the programmer cannot reach your reconfigured smart card to turn it off."*

Isn't all of this highly illegal? The answer is dependent upon where you use any of these parts and how you use them.

The MK 12 or variations of it are easily mislabelled to disguise their intended use. And in fact, the three chip component parts can be secured through reputable parts houses (such as RS Components in Sydney) for less than A\$30. Circuit diagrams for the reader / writer are freely posted on Internet. (4) In short, reader / writers are (like guns) only devices *capable* of doing something illegal (or, totally legal). Attempts to stop them at a point of entry to a country would be futile since even a novice can assemble them from parts secured locally using Internet instruction. And, they have legitimate uses as well including vending machine operations, gasoline air mile collector cards, telephone calling cards, (GSM) mobile telephone cards and (... the list is quite lengthy). Technically, the MK 12 can read and write an ISO7816 class of card.

The MK 12 becomes a tool only when connected to a PC and software. That the software is freely available on Internet presents another "control" challenge. When used inside of a home by one person for their own amusement (or reward), detection of its misuse is virtually impossible. But is it cost effective? The answer, increasingly, is yes. Pricing for the MK12 at A\$250 makes it marginal when weighed against the annual charges of pay-TV services (remember - at some stage the user also needs a PC). If pay-TV costs \$600 a year (\$50 a month), the cost of a suitable (used) 486 class PC and the MK12 comes to virtually the same number. If the home already has a PC (or access to one) and the reader / writer is assembled from locally procured parts, the total cost will fall between A\$30 and A\$50. Suddenly the cost of "beating" the pay-TV system charges becomes very affordable.

But is it only for "technonerds" with PC ability and the skills to assemble the board? We thought so until in our investigation CTD located a plumber in Australia who had never previously assembled anything electronic or used a PC prior to his adventure. Perhaps he was an unusual case of latent skills never previously put to the test - but in 8 evenings of "puttering" (his phrase) he had it working. *"watching World Movies and all of the rest for free!"*



MK12 Drawing, (JP1 closed for pic programming) (JP2 closed for PIC wafer card programming) (SW5 position 1 for PIC programming position 2 for ISO7816 programming) (SW6 position 1 for blocher, position 2 for normal operation) Designed by Paul Maxwell-King Email: paul@maxking.demon.co.uk

4/ MK12 reader / writer schematic available at numerous Internet sources (see maxking)

Illegal? Australian law as presently configured will rely heavily on the Trade Practices Act to deal with widespread consumerism of the practice described here. Copyright Law, the normal protector of pay-TV access, is woefully out of date in Australia and while it might be cited to bring suspected violators to court, present copyright law is unlikely to be a serious tool of enforcement. There is already talk in Australian pay-TV circles of an "urgent need to have new legislation adopted" at the earliest possible date.

In New Zealand, the 1994 Copyright Law is far more explicit. Any commercial distribution of the technology (in the form of ready to use unofficial smart cards) would instantly run up against the 1994 law. Individual tampering with cards for private use would probably escape prosecution and in fact this private application *may* not be illegal under the recently adopted law. (5)

How Serious is this Threat?

Large scale violation of Irdeto security has occurred. For every five paying subscribers to existing European / African / Middle East pay-TV systems, piracy sources believe there is 1 unofficial viewer. This equates to between 15 and 20% of all existing viewers not paying the programmers for their service.

Piracy occurs at three levels and each must be evaluated by programmers seeking to protect the integrity of their commercial business.

Level one. Individual "hackers" playing in the sanctity of their home or office, not involved in commercial exploitation of their skills. These people are a nuisance but as long as the hardware and software required to bust the conditional access remains complicated to use, this level is largely ignored.

Level two. Individual hackers who graduate to supplying friends and relatives with unofficial cards. At this level, losses for the pay programmer mount and the security of the hack source may break down. From the programmer's perspective, this level needs to be controlled before they turn into level three violators.

Level three. These are business people employing as much sophistication in the pursuit of their business as the programmer does in his. Their operating facility is well disguised, the unofficial cards distributed through links that make it as difficult as possible for investigators to trace their route of passage. Most bulk card creators deal in wholesale lots not unlike the distribution methods employed for illegal drugs. The actual consumer is typically 3, 4 or 5 layers away from the card source.

European sources are presently able to hide behind incomplete laws. As the individual countries of Europe slowly come together under the EC, national laws that address pay-TV signal piracy are administered in ways that have created loopholes for practitioners of this black art. A web site posting from one Dutch source explains:

"The current legal status is not completely clear. It is illegal to use and sell a card which decrypts channels for which the broadcaster has a license in that country. For instance, it is illegal to use a pirate card that decrypts Canal + Netherlands when you are residing in the Netherlands and using the card in the Netherlands since that channel is licensed in the Netherlands. However, the situation within countries like Denmark and Sweden is not completely black and white since we know of dealers openly selling such cards in these countries. There are current EC papers which are in discussion at present to make such trade illegal. When such EC legislation comes into force, Multi Sat Nederland will no longer make these cards available for sale."

European sources for Australian (or New Zealand) smart cards are unlikely to develop. However, CTD has learned that recordings of the existing Austar / Foxtel / Optus Irdeto data streams have been sent to European programmers and the Australian version of Irdeto compared on a data bit entry by data bit entry basis with Irdeto in Europe and Africa. The result - software to "hack" the Australian

5/ It is important to understand the Sky NZ NDS protected digital stream now transitioning from test phase to operational phase has **not** been cracked to date. However, their Videocrypt analogue stream has been freely available to Internet researchers since April 1994. The BSkyB system inaugurated in the UK on October 1 is currently "under attack" by European pirates and logic suggests when (not if) it is broken, the same technology will become available to New Zealand pirates as well. Under the 1994 (NZ) Copyright Act, section 227 prescribes a fine of \$5,000 for anyone caught receiving a NZ originated encrypted transmission without paying.

Australian10version supplied by European sources has already come back into the Pacific and is being distributed presently between level one hackers. Of passing interest - software programmes to turn the Irdeto data stream into an Internet transportable file simplified "transporting" the raw data from Australia to Europe. It was not necessary to physically ship a "recording" of the data stream.

Which points up the world-wide nature of the piracy beast. Within the levels of hackers there are strict protocols that define the sharing of information. Home-style hackers are at the bottom of the heap, and are largely dependent upon "crumbs" dropped by commercial hackers. Within the commercial hacking world there exists rivalry that often manifests itself in unprofessional ways. Commercial hacker "A", angry over some real or imagined activity from hacker "B," knows how to "get even." "A" simply releases to level 1 or 2 hackers the "seed keys" to hacker "B" cards which in a short time results in hacker "B" being out of business. Much of the so-called "public domain software" became public domain because of hacker wars. "Reverse engineering" of hacks is an important portion of all commercial hacking activities.

There is also the suspicion that commercial wars may extend higher than to the professional pirates. A favourite bit of cocktail party gossip in Australia at the moment claims the hack of Austar and Optus Irdeto was at least encouraged if not actually pushed by a competitor. Certainly significant damage in a competitive market such as Australia would result if one programmer elected to torpedo the conditional access system of another. (6)

The Future

In the worst case scenario, Irdeto as a conditional access system for MPEG-2 digital television distribution is on a short string and will wind up prematurely because of massive cracks in its security. Before that happens, legislation to clearly prohibit hacking activities (on at least level two and three) is probable but not certain to pass in enough jurisdictions to stop the erosion of Irdeto system customer bases.

There remains the *possibility* that Irdeto has not fired all of the bullets in its ECM (electronic counter measure) arsenal, that they can retard the further spread of piracy by doing something magic to their existing data streams which will shut off the current hacks. Unfortunately, this is a round robin approach where each new configuration of the data stream (knocking out existing pirate cards) results in redesign of the pirate cards. BSkyB's UK analogue service using the same Videocrypt as Sky NZ is currently supported by what they call a "Series 10" smart card. Each time a programmer changes the data stream to shut off pirates, he is also obliged to replace his entire universe of smart cards in the hands of official viewers. Setting aside the US\$12-\$18 cost of replacing cards for all subscribers, the upgrade seldom stops the pirates. In fact, they welcome the change because now they are able to resell new level pirate cards to their own customers. Of interest, SKY NZ smart cards lag far behind the card series in use in the UK primarily because to date there has been no level 3 distribution of piracy cards here.

6/ Sources within Optus admit their growing concern that Irdeto is not a suitable security system for the launch of their long-anticipated satellite pay TV service. In fact, during October a "team" of Optus transmission specialists toured Europe inspecting alternate conditional access systems (Via Access a French system, was one). Optus, which selected the UEC model 642 IRD for its smart card protected Aurora platform, has now learned that the UEC receiver has been significantly "compromised" by European pirates, even to the extent that infield hardware changes to this IRD are partially responsible for the Irdeto muck-up in Europe. One possible solution - a new "anti-blocker chip" to be built into a new IRD that eliminates the software data stream block solution now employed by Irdeto pirates. And the most likely IRD supplier able to supply a new IRD for Optus satellite - on short notice? Not UEC - but Panasonic through their Wales plant. Further evidence that Irdeto's tenure in Australia is limited - a decision yet to be announced that Sky (Australia) - the horse and dog racing service - has selected NDS for their security system and PAS-8 (not an Optus satellite) as a delivery vehicle. All of this paints the image of an Australian encryption world that will grow increasingly more complex, and splintered, during 1999; Austar holding onto Irdeto as long as it is able, Foxtel (Satellite) using NDS, Optus using a new (to be named) CA system and the Aurora portion of the RABS project using Irdeto while other portions use Scientific Atlanta PowerVu.

TECHNOLOGY BYTES

...BITS and BYTES you may have missed in the rush to make a dollar ...

October 30, 1998 ♦ VOLUME 98-9-52

Satellite TV & Radio

Massive Aurora project software problems. Initiation of service for central Australia (NT) is being delayed weeks - could stretch into months - while engineers at Optus and customer Imparja TV try to sort out solution to software glitches that are preventing addition of central zone services. Pictures freeze up, lock into tiles, audio burps and bumbles and the evidence points at incompatibility between the Irdeto data stream and the Divicom multiplexer (MUX). Reports of serious problems with the Divicom MUX first surfaced last February, have never gone away despite attempts by Optus to assure all participating parties the MUX system was operating properly. Perhaps, but insiders say there are non-DVB-compliant technical issues surrounding the Divicom unit. What this means for those anticipating conversion of central Australia zone B-MAC analogue to digital is further extended waits while the problems sort out. For the Northeast (Queensland) and Southeast (New South Wales) B-MAC clients, the transition period now seems well into 1999.

BBC World scheduled move from present long standing spot within California Bouquet (PAS-2, 3901/1249Hz) to 3743/1407Vt (Msym 21.800, FEC 3/4) is creating problems for users. The new frequency is reported to be below useful levels on 7m dishes in New Zealand, 6m dishes in NSW. BBC's Sydney office acknowledges complaints, is not certain if the present feed on 3901 will be turned off as originally scheduled on October 31. If it is, most users of BBC World will be flat out of luck. Service started off usable on smaller dishes, rapidly deteriorated. Same problem occurred when TVSN used this transponder space for analogue distribution; this is a half transponder that is shared with China's CCTV bouquet which has also been erratic in signal level for more than one year.

Divicom uplink package as used by Optus for Aurora and planned for Optus Vision satellite. Persistent reports the uplink MUX is somehow not DVB compliant will not be verified by anyone at Divicom. New Zealand representative Ray Sanders (64-9-415-6490) insists the MediaNode MN-20 uplink MUX package "*is in full compliance with DVB-ASI MPEG-2 transport streams.*" Curiously, sources at Optus are blaming the Divicom plus Irdeto package in Australia for ongoing problems with their Aurora platform performance (see report above).

French TV5 service undergoing major revamp. New schedules will include greater regionalising of materials distributed (rather than one international feed), addition of advertising, subtitling of programming.

PAS-8 scheduled launch date: November 5 via Russian Proton launch vehicle. JCSAT-6 now announced for January 14 at 00:40UTC using Atlas vehicle. To view the PanAmSat PAS-8 footprint coverage predicted, go to Internet for <http://www.panamsat.com/sat/beam/australi.htm>.

L-band CD radio service provider AfriStar (first of 3 satellites) has been jumped ahead to October 28th scheduled launch date via Ariane V113.

Singapore's ST1 satellite at 88E has an announced commercial service start date of 1 November.

New digital activity. Palapa C2M, 3455/1695Hz (Msym 8.000, 3/4) with very strong signal into New Zealand, Australia; Indonesian broadcaster RCTI with "default" heading. PAS-2, two test cards appearing on

Component vs. Composite

Terminology is sometimes elusive, especially when two words are nearly identical in composition but opposite in meaning. An example. We reported Sky NZ digital IRD would have S-VHS composite video output jack when in fact we should have called it S-VHS **component** video. There is a world of difference between the two. With component video, the user has the individual video parts originating at the video source, through compression and the satellite, then through the receiving IRD direct to the television. This is not to be confused with digital throughput - but from a video quality point of view, **component** S-VHS output from the receiver connected to the S-VHS **component** input on the TV set is a vastly superior technique to allowing the video to become "modulated analogue" (composite) at any point in the delivery chain. Our apology for the semantics error.

4189/961Hz (Msym 6.600, 7/8). The Filipino Channel (TFC) has begun on PAS-2 3743/1407Vt within recently activated bouquet that includes BBC World (Msym 21.800, 3/4).

Revised digital assignments. TVNZ SCPC digital on Intelsat 701 at 180E has moved from 3802/1348RHC to 3856/1294RHC; and 3793/1357RHC has moved to 3847/1303RHC. Other parameters remain as posted in SatFACTS. Laos TV on AsiaSat 2 (4143/1007Hz) has left the air. Army TV (Thaicom 3) has left 3600/1550Hz. APTV Asia Pacific now on AsiaSat 2 3786/1364Hz while APTV Asia Oceania is new to 3799/1351Hz. Reuters TV has appeared on 3770/1380Hz as replacement for WTN Moscow - may be temporary assignment (Msym 5.632, FEC 3/4).

Russian satellite at 96.5E has suddenly become much stronger suggesting satellite has been replaced; most likely replacement would come from 161E where ex-142.5E Gorizont had been moved as a temporary assist to Philippines. On 3675/1475RHC, big time signal in SECAM analogue from Russian ORT network plus TVM on 3825/1325 and VRK on 3875/1275.

Analogue changes. Palapa C2M, CNNI has shifted slightly from 3980/1170Vt to 3970/1180Vt, possibly in preparation for addition of a CNNI digital service in same transponder. Also C2M - ANteve on 4020/1030Vt is reported to be off the air; another Indonesian casualty?

Kermit and Hallmark services on ApStar 2R have extended their FTA preview period; Kermit ran FTA during September with 3 hour programme loop, expanded to 24 hour service and remained FTA during October; Hallmark channel, previously FTA, has returned to that status as well.

Seventh Day Adventist use of PAS-2. Aggressive "Net 98" linking using digital transmission techniques to reach church groups world-wide has had its share of problems. Planned to carry as many as 40 language channels, the service first came up October 9 using 3939/1211Vt. Serious reception problems started series of frequency hops throughout PAS-2 bird which became so confusing to mostly first-timer church groups trying to follow the bouncing signal that a web site was created to advise latest transponder information. In October 8th fax advisory to several hundred participating sites, project manager wrote, *"The signal strength from this transponder is obviously not enough. Some of you are getting a signal lock but with low video quality. Most are not getting even a lock, although when you check other transponders on the same satellite, the pictures are excellent. This tells us your equipment is functioning properly and your tuning has been done correctly. There seems to be a problem finding another (PAS-2) transponder that has not been previously booked. Please make this a matter for your prayers! We trust in the Lord at this crucial time that a satisfactory transponder will become available."* Format has been Scientific Atlanta PowerVu, but FTA. This is a temporary service built around a special church event and is not related to the permanent service expected on Orion 2 when it becomes operational from 139E around mid-April. For an update try <http://www.amcdiscovery.com.au>.

Optus DTH plans are not revealed but their web site is worth a visit if you can somehow manage the address. http://www.optus.net.au/nav/yes_optus.htm?doc_num=6.10.3.1.2.2&nav_mode=conn.

Star TV Asia - some contacts worth adding to your black book. Channel [V] is Simon Dewhurst (tel 852-2621-7213 and fax 852-2621-7257); Star Plus (India Programming) is Arrow Sinha Roy (tel 9122-852-3880 and fax 9122-852-1613). Chinese / Phoenix is Shirley Po (tel 852-2621-7380 and fax 852-2621-7388). Star World is Jamie Davis (tel 852-2621-7631 and fax 852-2621-8031).

IRD CAM source. For Nokia 9200 and 9500 IRDs - try Joe Ibrahim <digitalsales@provider.co.uk> Sterling 59. Same source for Via Access common interface Cams at 69 pounds each.

X-COM CDTV200 direct from France at US\$335.75 FOB Paris; fax interest to 33-4-91-92-83-56.

Merger mania continues. Comsat, US member of Intelsat, proposes merger with aircraft and satellite builder Lockheed Martin. Comsat was created by US Congress under very special circumstances, has unique monopoly position for international satellite connections.

40% Murdoch. October plan placed before US Department of Justice (DOJ) for approved use of News Corp Ku band high power orbit spot created to serve North America (110W) had 61% of Primestar being acquired by News Corp. And then, 10% of that going to French pay-TV firm Canal + for reported US\$500 million with News Corp ending up at end with 40%; approximately same level of participation as firm holds in Sky NZ. Alas, faced with long delays and having to defend plan before court case brought by DOJ, Primestar in mid-October announced it was calling off Murdoch/News Corp deal and would no longer plan around gaining access to the Murdoch/MCI owned high power slots. News-Murdoch and MCI paid US\$682.5 million for the orbital location. Where now for Murdoch/News? One possibility requires a roadmap to stay on course. (1) Murdoch, facing November court hearing in suits with Echostar, could settle suit by transferring 110W spot to Echostar. There are two Loral brand satellites involved as well, ready for 110W operation. (2) Primestar, under great pressure from US officials because it is owned and controlled by powerful cable TV interests, would fold into one of the existing DBS operations, possibly DirecTV. Primestar continues to overspend its income by an estimated US\$45 million each month and the present line of credit will run out before April (1999). Primestar recently cancelled launch of new satellite scheduled for November. Murdoch, meanwhile, told annual News Corp stockholders meeting held in Adelaide their plans to float 13.4% of all News Corp entertainment divisions

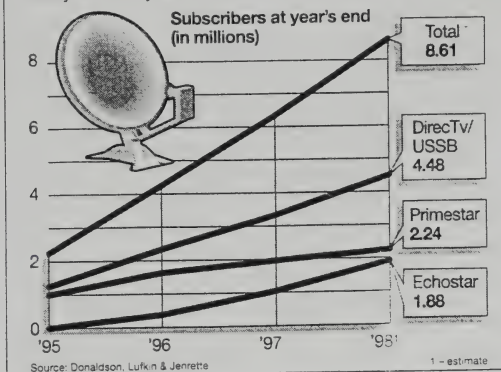
Direct satellite vs. cable in USA

Direct satellite TV to US households is on target for 37% growth in this calendar year according to a study by a US study group. The three majors are expected to end the year with 8.61 million homes on line. Cable operators are clawing back, adding digital channel capability and growing to the DBS region of 200 channels delivered to households. Cable is also offering high speed Internet through still expensive set-top modems (US\$400 and up) but DBS has introduced a similar service. DBS is also to be first with high definition TV and forecasts 30% growth in 1999. Latest marketing move to boost sale

of US dish systems: Echostar announced any consumer purchasing US\$249 home "DISH" system would receive full reimbursement if they agreed to take DISH \$49.89 monthly programming package. The full reimbursement approach is similar to the way cellular telephones are sold world-wide. Chain operator Sears is major promoter of DISH system in USA.

Satellite TV grows

Though competition with cable is heating up, the number of subscribers to direct broadcast satellite TV is expected to jump nearly 37% this year.



is being put on shelf "until (stock) market settles down." Sale of interest in (US) Fox TV Network, Fox TV stations, Fox Film Entertainment, Fox news and sports channels and recently acquired Los Angeles Dodgers baseball team was involved in IPO (initial public offering). Murdoch told attendees, "We don't need the money, we have no plans to spend our large cash reserves in the short term and we have no plans for big acquisitions."

UK BSkyB is off and running offering 150 channel (video plus audio only) digital package. Service projects 200,000 digital subscribers by end of this year, has 3.5 million analogue subscribers for original service, about half of whom are served through cable TV systems.

Ten year projection: 1,700 new satellites to be launched of which 70% will be commercial (balance military). A 1998 version communications satellite has 20 times the throughput capacity of one built in 1988, but typically costs the same in 1988 dollars.

Pace MicroTechnology, while not admitting it had violated patents held by RCA Thomson Licensing Corp. has agreed to pay US\$1.6 million for retroactive right to build MPEG-2 family IRDs through January 1, 1999. Pace spokesperson says this amounts to approximately US\$1 per IRD manufactured to date with MPEG-2 technology. RCA and Thomson hold key patents in MPEG-2 area, Pace says it has manufactured nearly 2 million such products to date..

AP (Associated Press) take-over of former ABC (USA network) owned Worldwide TV News (WTN) is now complete. Former WTN feeds found on satellite are now carrying APTV or APTN logos.

Our report in last edition of CTD of Bahamas based company offering bargain basement priced digital IRDs - the company now confirms these units can only be used in 220-250 volt regions with addition of external power transformer. Moreover, video processing is indeed for NTSC origin signals only. Pass on this one at any price.

Digital TV & Radio

Two reports pointing out side benefits of digital conversion. NZ Hillary Commission in Sports Entertainment Television report cites likelihood that with development of "digital TV, there could be many more channels and these channels will need sports programmes to attract viewers because sport has a proven pulling power." The report also warns of increasing pressure to turn "major sporting events into pay per view" with the prospect that such events will command a \$10 per home viewing charge "within five years." A second report from digital TV equipment supplier Harris cites a "major shortage in technical personnel, particularly at the engineering level, at a time when more, not fewer, engineers are required." The report cites the trend for those entering broadcast related industries to opt for the more glamorous "on air" and programme production slots which it notes, "was perhaps understandable given the relatively frozen status of analogue television technology." Digital TV station chief engineers in North American typically command between US\$45,000 and \$62,000.

Australia's decision to adopt European COFDM (DVB-T) format for terrestrial digital television transmission has drawn extensive flack from America's Advanced TV Systems Committee. Australia conducted

Quotable Quotes

US FCC Commissioner Powell on subject of public acceptance of DTV.

"Just because something is gee-whiz technology does not mean the consumers will embrace it."

John Swanson of Cox Broadcasting on same subject.

"Broadcasters must not get so carried away with the technology that they lose sight of their main goal - making a profit."

comprehensive side by side trials of US and European systems, came to conclusions the European model better suited their needs. The US is concerned that Australian decision, which they see as a flawed decision, could impact other national decisions. ATSC says they do not expect to get the Australian's to change their minds, but have taken the unusual step of posting a 27 page "rebuttal" to the Australian decision on Internet (www.atsc.org). The ATSC document sets out that *"in many cases after testing the two systems side by side, the data supported different conclusions than those reached by Australia. The agony of COFDM is that its performance consistently falls short of its promise. Based upon the Australian test results, it is clear to us and should be clear to any other engineering group that the ATSC system will outperform DVB-T in an actual installation."* ATSC sources contacted by CTD told us, *"We want to set the record straight; the Australians made a bad decision and the world should know the calibre of engineering skills making their decision."* You can decide for yourself at www.atsc.org.

Unhappy users of current satellite digital IRDs complaining about failure of video and audio to remain in sync (audio lags or comes ahead of lip movement of on screen person) may rejoice about new "Generator chip" from Burr-Brown. Chip sells for US\$1.95 in quantities as small as 1,000, corrects timing required to maintain lip sync functions by correlating separate audio and video timing clocks to single reference.

Firewire encryption. The major obstacle to producing television sets that are capable of being directly integrated with DVD players, CD players and a host of new market peripherals is the connection routine. Digital talks to digital but only when they speak the same (digital) "language." There are more digital formats than can quickly be counted, and each piece of hardware (a DVD player, for example) has its own routines. Even when they all follow the same MPEG-2 format, there are still major differences in data streams. All of this has to be resolved before your computer can talk to your television set can talk to your DVD player can talk to your IEEE proposed 1394 standard would partially solve this problem with what the industry calls a "firewire." Unfortunately, the "fire" part describes the fact that originally encrypted video (etc.) data bits passing through the "wire" are not encrypted at that point. And that raises major concerns with copyright holders; namely, the movie producers. After going to a great deal of trouble to create DVD encryption in a format they totally control, copyright owners do not want to see their encryption stripped away inside of a processor or player in such a way that clever people can dig into the circuits and attach copying devices. In short, the connection wires must be themselves protected to ensure "pirates" don't get at the data stream. There are at least three serious proposals to fix this threat. Each involves creating yet another encryption routine that will take the originally encrypted signal, after it has been decrypted, and encrypting it again for that short time the data stream passes from the output of the DVD player to the input of the digital TV receiver. Once inside of the TV set, they propose to again decrypt the signal. If all of this seems fanciful, there is more. Encryption routines involve mathematical algorithms or number combinations that ostensibly create a "code" which hackers cannot break. The more complex the algorithm, the less likely that hackers will bust the code. And the more complex the algorithm, the closer it comes to "top security" military codes which are protected jealously by national governments. So the US has a law that prohibits shipping overseas any device that employs an algorithm of more than 56 bits. Until very recently, algorithms using more than 40 bits of encryption code were not available for export. Because virtually all CE (consumer electronics) hardware and most PC (personal computer) hardware is designed and manufactured outside of the USA, even a simple thing like a "firewire" protection system built into future generation CE and PC products must be cleared in advance by the US government. So as a result of this quandary, the first shipment of digital TV (DTV) receivers now entering the United States and UK are arriving without the capacity to interconnect to DVD players and others through a firewire system. And until a suitable code system is approved as a standard, and an encryption system approved by the US government, there will be no DVD players, PCs, TV sets, and so on offered for sale with any type of 1394 or other "firewire" interconnection system. Oh yes - that includes the satellite IRDs brought into New Zealand and Australia for pay-TV service. So it is not the fault of Sky NZ (or Austar et al) that they are not offering flow-through digital data stream receivers at this time; they simply cannot be manufactured until the 1394 proposed standard is approved. And that won't happen until a firewire encryption standard is adopted. And that won't happen until the US government get the picture? (Year 2000 seems like a possible implementation date.)

Australia's Level of Dissatisfaction with Pay TV

Although there are many (often several hundred) news group postings each week lamenting the status of pay TV in Australia, most have limited distribution and at best create a sense of direction for the human equation that governs pay TV services. This posting from Newsgroup aus.tv.pay is an example.

"Australian pay TV is the greatest farce in my time on the planet. What really makes you see what a joke it is comes home when watching coverage of a cricket event from India and listening to their local commentators. India is supposed to be a third world country - the commentators talk about their '45 channel cable TV' and the (US)\$10 per month fee and their coverage includes all of the cricket played in Australia as well as global each year. As for Fox Sports, it is farcical. They boast of 'live coverage' of major events and create on air promos designed to attract us to the screen. What we end up seeing, such as with the US Masters Golf, is a highlight package that is delayed, not live at all. Or look at the programming content. Someone should nominate Discovery for the Guinness Book of Records for the number of times a particular programme is repeated. Month after month, not merely within a month. The only competition we have in Australian pay TV is who is going to be the biggest financial loser. At the moment the hands down winner is the public!"

Interim component video plug and jack system - found on some TV sets and Sky NZ Pace DSR-620 IRDs is a temporary method of interconnecting the satellite IRD to a TV set using analogue techniques. Just to further confuse the interconnection issue, Mitsubishi in their new DTH terrestrial receivers has added a new version component video input jack. This one, not compatible with any existing 3-prong S-VHS input jacks, is based upon the horizontal scan rate of the 1080i digital signal to produce Y, Pb and Pr feeds. The existing S-VHS socket is based upon a much lower horizontal scan rate. Mitsubishi, Panasonic, Pioneer, Sharp and Sony have adopted this new interim S-VHS socket for their DTV products.

First HDTV broadcast of NFL (grid iron) game is scheduled for November 8th on CBS-TV; three more will follow before mid-January.

First TV series shot in HDTV, 22 episode "Secret Adventures of Jules Verne," is now completed and in final editing. Series was produced by Montreal's Talisman Crest Ltd., used four Sony digital camcorders in 1080i widescreen format.

Consumer Electronics

Dixons, major UK consumer electronics retailer, is offering consumers unlimited access to Internet through a new freeserve site (www.freeserve.net). Consumers using this no charge site have access to e-mail, news channels, search engines and host of other services with no monthly charge. Typical ISP charges in UK and Ireland is around NZ\$40 per month. Customers pay cost of local phone call to site, must agree to supply some demographic information about themselves and their uses of Internet as part of deal. There are some restrictions. To sign up for Freeserve.net, users must certify this to be their ISP. That eliminates users from easily switching to other ISPs. Initial sign-up is done using CD-ROM being distributed at Dixons stores. The ISP has installed filters that eliminate access to hacker, pornography sites and users must agree to abide by lawful activity agreement.

Sony New Zealand Limited is getting out of the warehouse business. The firm has contracted with New Wave Transport (Australia) Pty Ltd for new warehousing located at Bell Avenue, Mt Wellington, Auckland. Sony personnel, some of whom have been with the company 20 years, have transferred to NWT.

DIVX shifted from isolated test marketing to a national rollout at 700 (US) stores during October. The programme was supported by approximately 180 rental (DVD) titles, claims new additional titles at 40 per month are in stream. RCA Divx deck, RC5230Z, with US\$599 list went on sale in mid October at retail outlets. The first model will only last 60 days - RCA will replace it with DTS pass through capable model RC5231Z at same list price. Also in the Divx camp, Proscan model PS8680Z at US\$699 list is step-up model from Thomson.

DVD on-line disc renter NetFlix now has 2,000 titles in inventory, is promoting differences between its operation and DIVX (7 days versus 2 day rental, automatic rental extension, 10 times as many titles as DIVX and option of applying rental of discs against purchase price).

DVD players experienced unexpected increase in sales during September pushing total number of players sold for calendar year past 500,000 mark. Actual number of DVD player sales totalled 113,558 for month compared with 34,371 units sold in September 1997.

DTS feature finally arriving. Universal Studios Home Video says it will release 20 titles with DTS stereo treatment during first half of 1999. Fans of stereo format, aware that DVD has capacity to offer theatre sound

Status Report DVD in Pacific

Region 1 (North America) release windows are tightening up; 20th Century Fox has plans to do day and date coincidental release on DVD with VHS as soon as January. A new problem for retailers and users of DVD involving China. Movies originally licensed to Chinese firms for release on their special VCD (video CD) format have begun appearing on DVD through web sites (example: www.ebay.com). It appears the Chinese are taking VCD titles only authorised for Chinese distribution and pressing them in the DVD format for sale. Six Disney animation titles (including Cinderella, Alice in Wonderland, Fantasia) appear on the cited web site; Disney to date has released no animation films on DVD. Other "classics" included in the listing are "Casablanca," "War and Peace," and Ten Commandments." The same discs are reported on sale in Hong Kong shops and the shop keepers claim the titles are coming to them from Thailand. One theory is these not licensed titles are being taken from laser disc pressings and those who have seen the discs note the packaging is very poor and the quality of the reproduction far below normal DVD standards. US pricing for the discs seems to be under \$20.

Australian source for Region 4 and region free players is

[http://sydney.citysearch.com.au/E/V/SYDNE/0021/48/41/campsie Hi-Fi](http://sydney.citysearch.com.au/E/V/SYDNE/0021/48/41/campsie-Hi-Fi) (telephone 61-2-9718-0265). Multizone (region free) players range from A\$899 (Pioneer DV-505) to A\$1,950 (Pioneer DVL-909) with 9 models to select from. Same firm will modify Region 4 players for region free and cancellation of Macrovision anti-copying circuitry for prices that begin at A\$85.

New (Region 1) releases scheduled:

Dreamworks (Spielberg) - all early December - "Small Soldiers," "Mouse Hunt," "The Peacemaker."

Paramount - before December 15 - "Deep Impact," "Howard Stern's Private Parts," "Sliding Doors," and "Event Horizon."

Buena Vista (Disney) - January - "Armageddon," "Don't Be a Menace," "Emma," and "Terminal Velocity."

MGM - January - "Overboard," "National Velvet," "Warriors of Virtue," "The Black Stallion," "The Pebble and the Penguin."

Universal - January - "Out of Sight:SE"

Columbia/Tri-Star - January - "Dance With Me," early '99 - "Close Encounters:SE," "El Mariachi/Desperado: Special Edition."

Paramount - January - "The Truman Show"

Polygram - January - "Return to Paradise"

DVD user comments on parallel importing of Region 1 discs, from Internet user groups.

"I've ordered 30 discs from DVDEXpress (<http://www.dvdexpress.com>) and I have never had a problem. They e-mail you to advise status of your order and if you use FEDX it comes straight to your door. I prefer using US International Priority Mail and discs take exactly 11 days from placement of the order. To avoid custom duties and get a value for money shipment, I always order a minimum of 3 discs and never more than 6. You have to watch the value of the Australian dollar when ordering 6 movies, however, because it can push the value of the package above the level where customs might take notice of the content. DVDEXpress is very good about labelling the packages, with stickers saying 'Computer software - value (US)\$30.'"

In response on the same news group.

"Customs is well aware of the value of DVDs and will not be fooled by a '\$30 valuation sticker' on the outside. They may open the package and inspect the 'real invoice' inside. I may be paranoid, but I have them shipped to a USA location where they are unwrapped, the invoice taken out, and a substitute invoice inserted in the new package listing them as 'used DVDs with a value of (US)\$10 each.'"

And this comment. "Just because it is a Region 1 disc does not necessarily mean the quality is better than Region 4. We have found all Columbia Tristar releases to be better on Region 4 release than those on Region 1. Having R1 is not a guarantee of absolute quality although in most cases you get not only releases faster but of a higher technical quality."

And, "Region 0 (i.e., region free) discs from the Criterion Collection seem to be a way around collecting some great films (Silence of the Lambs, Robocop, many more) without having to deal with this region business."

system, have lamented failure of studios to implement the feature. DVD-DTS from Universal will sell at premium: US\$34.95 and be distributed through limited outlets. Pioneer LDC Japan is first authoring firm to release a DTS disc.

JVC is expected to show new D-VHS format system that allows a movie to be simultaneously recorded in existing analogue format as well as new digital format on same tape cassette in side by side fashion. Movie studios say that if VHS tape format is going to survive beyond DVD, it will need to have ability to mingle both analogue and digital formats on same tape as means of cutting tape inventory costs for distributors and retailers. In this way, consumer would take pre-recorded tape home and pop into either analogue or digital format VCR for playback.

DVD feature not yet put to test. In original DVD specifications, standards were established and adopted allowing discs to be pre-programmed at various rating levels. A film could, for example, be pre-programmed in G, MA, even X levels all from the same disc. User would select level desired (such as G for children audience) while another showing of same disc could be at more adult level. Subject has come into focus after Utah retailer was "caught" editing VHS versions of Titanic for Mormon religion consumers who wanted film but also wished deletion of nudity, death and coarse language scenes. No legal action has been brought against the shop owner but in the rip tide that followed comes word that DVD could have solved this very nicely if only the system already in place had been implemented by the film's producers.

Audio system price cuts from major sellers of consumer home sound packages has hit US market. Pioneer is removing minimum advertised price (MAP) restrictions on 20 audio system models to encourage price cutting at retail. Yamaha is dropping suggested retail prices on 5 audio/video receiver systems by ten percent or more. Sony has introduced US\$399 price for 5 channel FM receiver with multiple inputs allow interconnection to home cinema big screen TV systems. JVC has dropped entry pricing on 200 CD automatic changer to US\$199 and pricing on A/V receivers by as much as 20%. Aiwa has dropped suggested retail pricing by 6 to 10%.

End of audio tape coming? With CD formats making heavy inroads in the way music is successfully packaged and sold, the April-June quarter report from the people who monitor blank audio tape production is not encouraging. Total production fell 7.1% while dollar value of shipments was off 11.3%. For the first six months of the year, shipment volume was down 4.6% while dollar value dropped 9.2% from comparable 1997 figures.

Daewoo service call may require optician. Latest large screen technology announced as ready for consumer marketplace, from Daewoo, employs 300,000 very tiny 100 micron miniature mirrors as projection system for TV images. The mirror array uses a 270 watt metal halide projection lamp to produce image brightness of 5,000 lumens; several orders of magnitude brighter than existing projection TV systems.

PC monitor tube pricing dropped 20% during first six months of year, now is heading back up. Shortage of tubes in 14 - 17" range is reason for price recovery with 14" size tubes now back up US\$5 and 17" rebounding by \$10. 14" size tubes may well be coming to end of their life in marketplace, being replaced by 15".

It can be done. New Canon digital still camera (EOS D6000) has shoot and record capability of 6,000,000 pixel detail (standard digital still cameras do well to reach 50,000 pixels). Price will stop all but the most serious - US\$26,000. Camera has equivalent sensitivity of ASA80 - 200 film, uses detachable EF series lenses.

Cable/Fibre/MMDS/Pay TV

Status of Sky (NZ) digital transition. Australian sources report, "up to 12,000 PACE DSR-620 IRDs intended for New Zealand are being diverted to Sky (Australia) for use with their horse-dog racing service." Sky NZ sources agree "bulk shipment of IRDs have *not* arrived" (October 21). How many digital programme channels are actually operating? Answer is maximum of 7 although in reality 5 is more normal. "We are still learning our way through the digital maze" notes Sky engineer. The data stream presently being transmitted tells the IRD to search for programme channels on 12.391, 12.546, 12.519 and 12.421 but in fact the (up to) 7 programme channels actually running - when they are running - are all on 12.391 (being, #1 - Mosaic, #2 - Sky Sports, #3 - Sky 1, #4 - Sky Sports, #5 - Sky Movies, #6 - Juice, #7 - Sky 1 S1 SV). 12.546 and 12.519 are located in the Optus transponder currently transmitting Sky Sport and Sky 1 in analogue and cannot actually be used to deliver digital services until all existing analogue installations are converted to digital and the analogue services turned off. Which brings us back to the status of the Pace receivers. The 12.421 frequency is currently in use for TAB/Trackside analogue and will only be available when the existing analogue (Trackside) installations are replaced with digital. When might that happen? Note there is no Trackside programme channel currently on digital - which suggests Trackside conversions to digital are not imminent. Nobody ever thought this was going to be simple.

Latest entrant. Superway Investments, headquartered in Auckland north shore community of Takapuna, has made public plan to provide a high capacity fibre optic network to an estimated 187,000 residents of North Shore City. Four year old firm has been trenching and thrusting in Glenfield sand Takapuna region for 18

Status of Starnet on Satellite

New Zealand (Australia) Internet provider IHUG formally launched its Internet DBS service during October. The system involves installation of a 90cm range dish pointed towards PAS-2 where a Ku beam service delivers 400kbps (or faster) direct to a PC. The service is available to ISP (Internet Service Providers) as well as individual users. In a test, one user reportedly downloaded a 100Mb file in less than five minutes time. Starnet is available to virtually any location in New Zealand (Australia) equipped with a standard telephone. In use, the user dials Starnet ISP (typically using a toll free number) which starts the connection process. Requests for access to web sites, Internet files are sent through the PC - modem standard connection. It is the return or download path where the system comes into play - downloading at speeds typically 20 times faster than standard telephone line connections. The system has a built-in 3 hour limit to prevent an unused line from tying up an ISP line but users requiring more than 3 hours simply redial their Starnet service.

The cost of the satellite package (antenna, LNB, PC card, installation) varies but averages in the region of NZ\$1,100 in New Zealand. Australian use is still in an embryonic state and users must be located within a telephone POP (point of presence) area to have toll free inward bound access.

There are several business opportunities here. In depth information is available from www.star.net.nz; those wishing to become installers should call Mick at 64-9-358-5067 (extension 716) or check installs@star.net.nz. Commercial users such as SMATV and cable should contact Ron Theaker at 64-9-358-5067 (extension 715) or check cabletv@ihug.co.nz. IHUG is offering bandwidth for commercial users between 64k and 8Mb featuring a complete USA Backbone to ISP delivery service.

months but to date has only installed conduit to carry future cables. When Taupo Cablevision, Inc. was shut down by the banks earlier this year (CTD 9802-45, p. 4), Superway was the major purchaser of 500 coaxial cable sold at auction. They acquired approximately 80,000 metres of cable at that time for a bargain price in the region of 25 cents per metre. The business plan for Superway is not announced although managing director Peter Pratt has told reporters their primary initial interest will be to service business and commercial firms, not individual homes, with a *"switched lease capacity to retailers of telecommunication services."* The firm has signed an interconnection agreement with Telecom NZ. In a September release, the firm said, *"The company's customers could be established service providers like Clear, Telstra, Telecom or a range of related companies."* The firm shares their headquarters building (205 Wairu Road) with Internet provider Voyager (OzEmail). As for the present status of the project, Pratt provides little detail. CTD investigation indicates conduit has been installed for perhaps 2.5km of which we estimate 1.3km is in fact residential. No cable had been installed at the time of our inspection; some conduit entry points have completely recovered (grass has regrown where the earth was disturbed). Crossings on Target Drive were incomplete with purple pipes protruding from the ground. Of interest, the ductway runs up Target Road beyond Ellice Road intersection for 30m which perhaps by coincidence butts onto a termination end for the now abandoned Telecom cable TV network. We counted 44 ground pits of varying sizes and shapes. The only significant business firm with obvious high speed data needs currently passed by the conduit system is Motion Pictures (TVNZ). If the intent is to provide higher speed Internet service to businesses in the immediate area, perhaps through collocated Voyager, there are currently some restrictions. Voyager presently has a 1.9 Mbps connection to Telstra's Sydney Internet Gateway plus a recently activated 4.5Mbps satellite connection. Neither of these "flow rates" would be likely to handle Internet needs for the area under consideration. Voyager has been a pioneer in New Zealand in Voice Over IP (VoIP) - see story p. 19). Who owns Skyways? Pratt says there are "about a dozen investors" and records indicate directors include Peter Pratt, Michael Frank Morais and Kerry Norman Holmes.

Sky Network is now Year 2000 Compliant with its subscriber management and billing system. An IBM AS/400 system purchased from Cincinnati Bell Information Systems has been installed to upgrade the level of support available to the customer service reps and technical field people as well as making the system Y2K. "Cablemaster 2000" allows Sky to mix and match customer service packages, the original system did not offer sufficient package options to accommodate the new array of digital services to be made available through 1999 and 2000.

Australian pay TV "rationalisation" update. Foxtel is telling callers they expect to have their own exclusive satellite TV service "functional by December 31st." The significance of that date is the turn around time anticipated between the scheduled launch of PanAmSat PAS-8 (now scheduled for November 5) and the turn on of the satellite. PAS-8 as previously reported has the technical capacity to serve dishes throughout much of

Towards Voice Telephone Calls on Internet

Voyager's Voice Over IP strategy is to offer Internet customers the opportunity to gain added value from their previously data-only Internet connections. VoIP rates are typically as much as

50% lower than "typical" long distance Telecom / Clear / Telstra (et al) rates but not necessarily lower than the leading "call back" operators. The new technology reduces toll charges by sending calls along the same high speed data links used by Voyager Internet users. VoIP quality gets better by the month with improved software but varies considerably with time of day. During daytime periods when Internet usage is low, VoIP quality is often the equal of cellular telephone. With increases in Internet use at night, voice dropouts, echo and delays are common. The quality suffers more on overseas links than domestic long distance as Voyager has no control over bandwidth beyond its own network. Voyager says their stated goal is to provide, "GSM cellular quality or better on all calls using the network."

Australia in the 60-80cm size class. Foxtel presently serves an estimated 50,000 ex-Galaxy homes with an interim service package arranged through regional satellite provider Austar. Negotiations between Foxtel, Optus Vision and Foxtel were intended to reach agreement that would allow each of the service providers to function within clearly defined marketing regions (i.e., they would agree to provide essentially the same programming but not in competition with one another in the same geographic regions). Foxtel reportedly was not willing to share its programming with Optus although regional operator Austar has apparently agreed to offer some Optus channels. Foxtel would have preferred to utilise the same Optus B3 satellite as Austar and Optus, but not at the price of giving up programming exclusivity. More recently, the conditional access system "crack" reported for their commonly shared Irdeto system has added a new element to Foxtel's reasons for going off on their own to PanAmSat PAS-8. They are expected to introduce the NDS (Murdoch controlled) conditional access system there utilising a Pace family IRD that will be very similar (if not identical) to the DSR-620 now being rolled out for Murdoch controlled Sky NZ. The next big news in this complicated scenario - an option extended to Australian firm PBL to invest in Foxtel which comes due this week.

TVNZ's 25% stake in Clear Communication has been tagged with a NZ\$70 million value by a scoping study created to evaluate TVNZ operating options. That TVNZ will dispose of the Clear investment is an accepted conclusion, only the timing of when it will do so remains to be settled. The scoping study report said the "conservative value" is (NZ) \$70m, but market forces could easily see the network realising more for its stake. The Clear holding is interwoven with TVNZ's technical arm BCL which currently provides the national broadcaster with linking between transmission sites as well as intra-network looping for programme production. BCL has been suggested for separate sale, but the scoping report suggests contrary. *"In effect, continued ownership of BCL provides TVNZ with an option over BCL's digital transmission capacity, removing potential difficulties and uncertainties, giving greater control and reducing risks in relation to the transmission to digital transmission."*

Bell Atlantic (parent of NZ Telecom) has begun offering "one-stop television service" in partnership with satellite TV provider DirecTV. Telephone firm is essentially marketing and installation arm for DirecTV combining terrestrial TV antenna installation and satellite system installation into a new line entry charge appearing on customer's telephone bill.

Cable subscribers will not escape the increasing presence of commercials in US. Commercial content on top 22 cable networks rose 17% during first six months of year and is projected to hit US\$7 billion for total year.

Austar, taking over former territory controlled by East Coast TV, has launched in Launceston region of Tasmania. Service is utilising MMDS terrestrial delivery from Mt Barrow with a monthly subscription rate of A\$42.90.

Terrestrial Broadcasting

Leaving the air. Hawkes Bay TV is for sale - including equipment and frequency. Station attempted local programming, then tourism slanted programming, ultimately TVSN relay until the shopping network folded. Queries to Paul Verhooven at 09-375-6282.

Full disclosure, low ratings. Release of President Clinton videotaped testimony through television networks and Internet drew lower than expected audience tune-in. Three US networks, 3 cable TV networks carried full testimony and their combined audience was AC Nielsen measured at 18.8. Of this, 11.3 was on TV networks, balance to cable services. Ratings were certainly higher than normal daytime programming but far below 1995 O.J. Simpson testimony also carried live by US networks. Internet release fared better by comparison; live video provider RealNetworks reported 2 million PCs connected. Of passing interest, highest 'rated' PC RealVideo

Dividends as a Measure of Terrestrial Broadcaster Financial Success

While controversy over the future of Television New Zealand (TVNZ) swirls around us, the following table comparing relative profits of same-region television broadcasters might be useful.

TV Network Operator	Last year reported net profit	Dividend declared
Prime Television (Australia)	A\$19m	24%
Seven Network Australia	A\$105m	57%
Telecasters Australia	A\$11m	55%
Ten Network Holdings Australia	A\$78m	47%
TVNZ/Television New Zealand	NZ\$30m	70%

release prior to this was live coverage of a woman giving birth to a baby. Internet sources reported the dial-in was high initially but dropped off rapidly as the testimony played on.

Mistaken identity. New Zealand TV audience measuring firm ACNielsen admits it was fooled when a PeopleMeter equipped home in Whangarei changed their TV aerial installation. The home, one of 440 nation-wide that has TV viewing monitored to determine viewing audience shares for advertising sale purposes, installed a new antenna and changed from receiving TV from the Parahaki transmitter site to the Horkaka site. In that change, the PeopleMeter believed the home was watching TV4 when in fact it was watching TV2. From mid-July to mid-August, each viewing of TV2 was attributed to TV4 which drove TV4 viewing on a national basis upwards by 1.8 rating points. One home out of 440 equates to a universe of 63,000 on a national basis. TV4 spotted the discrepancy when their ratings for infomercial periods shot ahead in the ACNielsen report but the real proof came when somebody noticed TV4 was getting audience even when its transmissions were shut down (the ultimate path to broadcast profits!).

Web site designers have new addition; .tv. Canadian firm TV Corp has announced new availability of .tv for web addresses as addition to established .com or .org and .net designations. TV Corp says the .tv will be licensed only to firms that have sites directly related to television.

SPRSCS '99 Scheduled for mid-March

The annual New Zealand hosted satellite and cable show conducted by SPACE Pacific will be held in the Far North of North Island at the site of Doubtless Bay Cable TV between the middle and end of March. This trade show gathering will be the fifth annual event. Details from SPACE Pacific at 64-9-406-0651.

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